

Q1: Multiple Choice Questions

Circle the correct answer for each of the following:

(10 × 1 marks)

i) 802.11 uses CRC of _____ bytes

- a. 3
- ☒ b. 4
- c. 5
- d. 6

ii) Chipping sequence is used in _____.

- a. CSMA/CD
- b. CSMA/CA
- ☒ c. CDMA
- d. CSMA/CN

iii) With regard to multimedia communications, the concept of "Token Bucket" is used in _____

- ☒ a. policing
- b. scheduling
- c. resource reservation protocol (RSVP)
- d. Laissez-Faire approach

iv) An entity that performs mobility functions on behalf of mobile, when mobile is remote, is called _____

- a. Foreign agent
- b. Correspondent
- ☒ c. Home agent
- d. Care-of-address

v) RTP packet DOES NOT provide _____

- a. payload type identification
- ☒ b. QoS guarantees
- c. packet sequence numbering
- d. time stamping

vi) When Signal-to-Noise (SNR) ratio increases, Bit Error Rate (BER) _____

- a. increases
- ☒ b. decreases
- c. remains constant
- d. None of the above

vii) The mechanism in which flow declares its needs, and the network may block call (e.g., busy signal) if it cannot meet needs, is known as

- a. Link Admission
- ☒ b. Call Admission
- c. Flow Admission
- d. Congestion Admission

viii) In _____ scanning, beacon frames are sent from access points

- ☒ a. passive
- b. active
- c. pervasive
- d. both active and passive

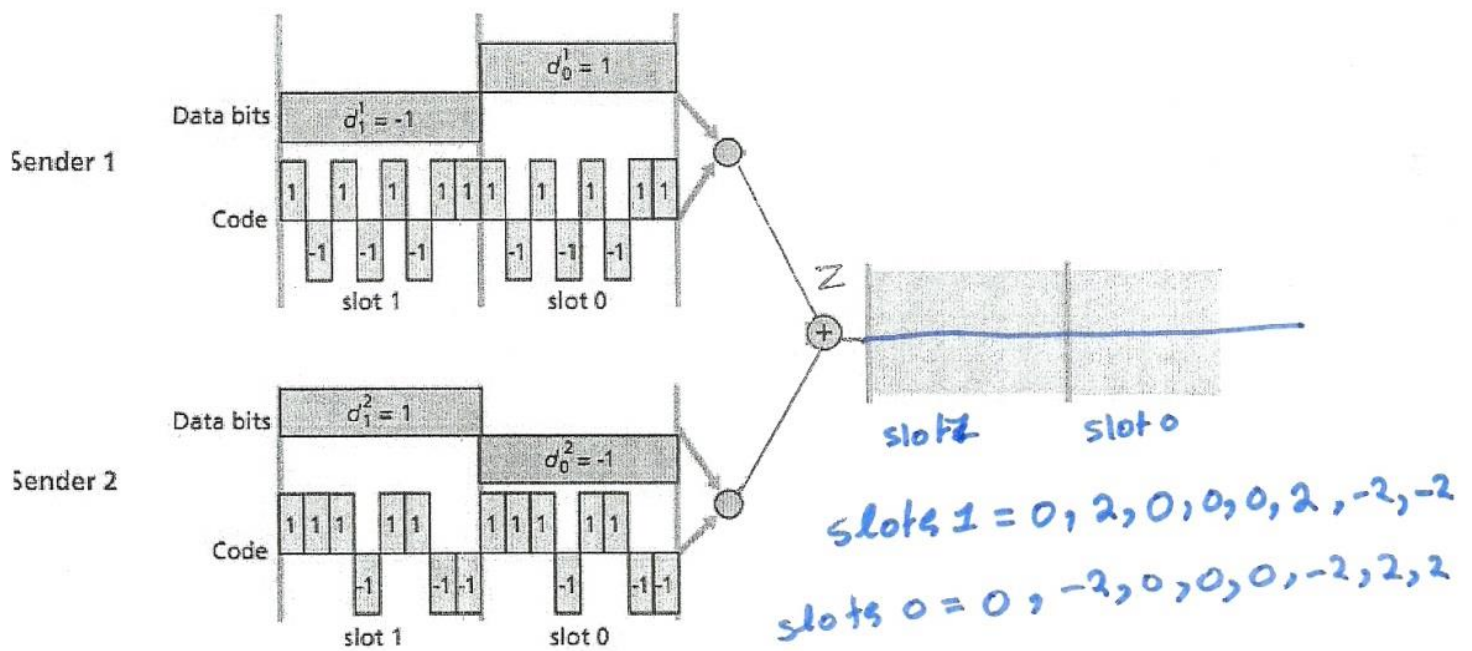
ix) In DiffServ, _____ is used for per-class traffic management

- a. edge router
- ☒ b. core router
- c. ad hoc mode
- d. registration with home agent

x) Which of the following features is NOT associated with Mobile IP

- e. indirect routing of datagrams
- f. agent discovery
- ☒ g. ad hoc mode
- h. registration with home agent

Q2. The following figure shows coding of two input channels using CDMA. What is the generated coded signal Z?



for sender 1:-

slot 1 = -1, 1, -1, 1, -1, 1, -1, -1

slot 0 = 1, -1, 1, -1, 1, -1, 1, 1

for sender 2:-

slot 1 = 1, 1, 1, -1, 1, 1, -1, -1

slot 0 = -1, -1, 1, 1, -1, -1, 1, 1

the result Z:-

slot 1 = 0, 2, 0, 0, 0, 2, -2, -2

slot 0 = 0, -2, 0, 0, 0, -2, 2, 2

-1 1 -1 1 -1 1 -1 -1, 1 -1 1 -1 1 1
 + 1 1 1 -1 1 1 -1 -1, -1 -1 -1 1 -1 1 1

 0 2 0 0 0 2 -2 -2, 0 -2 0 0 0 -2 2 2

Q3 (A): For each type of the network specified in column 1 of the table below, choose the appropriate option for the Infrastructure and Hops.

Type	Infrastructure (Yes/No)	Hops (Single/Multiple)
Ad hoc nets	No ✓	Single ✓
Bluetooth	No ✓	Single ✓
Cellular Network	Yes ✓	Single ✓
MANET	No ✓	multiple ✓
VANET	No ✓	multiple ✓
WiFi	Yes ✓	Single ✓
WiMax	Yes ✓	Single ✓

Q3(B): Compare the following versions of IEEE 802.11 wireless LAN.

	Operating Frequency Range	Maximum Data Rate
802.11 a	2.4-2.5 GHz ✓	54Mbps ✓
802.11 b	5-6 GHz ✓	11Mbps ✓
802.11 g	2.4-2.5 GHz ✓	54Mbps ✓
802.11 n	2.4-2.5 GHz ✓	200Mbps ✓

Q4

(A): What are the classes of multimedia applications? Give one feature of each application.

(B) Write down two possible usage of marking in "Edge Router Packet Marking"

(C) Write down the four steps involved in the migration of a mobile host using active scanning.

- (A) ① ~~streaming stored~~ multimedia: it is pre-recorded audio/video that is stored in the server and transmitted to the client, because it is pre-recorded, then the user can pause or forward it. Also, client can play out the media before all data arrives.
- ② Streaming live multimedia: it is smaller than broadcast radio and video, but the transmission takes place over the internet. Because it is not pre-recorded media, so the client can't ~~pause or forward~~ fast forward it.
- ③ Real-Time interactive: The users can communicate with each other in real time. There is time constrain, that the media should be transmitted in less than 150 milliseconds and less than 400 milliseconds to be acceptable.
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- (B) ① Based class marking: packets of different classes will be marked differently.
- ② Intra-class marking: the conforming flow will be marked different from non-conforming ones.
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- (C) ① the mobile host will send probe ^{request} packets to the ~~near~~ APs (access points) which are in its distance.
- ② the APs will send ~~pro~~ probe response packets to the mobile host
- ③ the mobile host sends ~~access~~ association request packets after choosing the AP in which it wants to associate with.
- ④ the AP will send ~~be~~ association response packets to the mobile host.

Q5: Answer ANY SIX of the following questions

- ✓a) What is the purpose of base station in mobile networks?
- ✓b) What is a wireless ad-hoc network? → shared bandwidth when needed → no sharing
- c) What is one main difference between Laissez-Faire and Diffserv approaches?
- d) What are the two important characteristics of Diffserv that make it attractive for multimedia communication?
- ✓e) Write down two features that RSVP DOES NOT support.
- ✓f) What are the two fundamental characteristics of multimedia networking applications?
- ✓g) Briefly explain the function of CSMA/CA
- ✓h) In 802.11 frame, there are four address fields. Provide the purpose of any two of these.

① (a): the base station ~~is~~ connects the wireless host to the wired (largest) network. As an example: internet 2.5

② (b): The networks that did not have a base station that connect them to the wired network. One of the nodes of this network will coordinate the transmissions of other nodes in the network. 2.5

③ (c): ① RSVP does not define how the resources will be reserved
② RSVP does not specify how will route the packets, this is the responsibility of routing protocols 2.5

④ (f): ① they are delay-sensitive: the media must be received in a few milliseconds. (end-end delay + jitter)
② they are loss-tolerant: the packets must be received with not Big loss. Each packet is important in these applications. 2.5

⑤ (g): CSMA/CA is a protocol that is used in wireless networks to avoid collisions. One way of avoiding the collisions is to have RTS (request to send) and CTS (clear to send) packets to reserve connection. In this process, the sender sends RTS packet to the base station. Then, the base station will send CTS packet to give this node the permission to send its data and to tell other nodes that it gives the permission to one node to send the data. Next, the host will send its data to the base station. Finally, the base station will send Ack to the host to ensure that the data has been received. 2.5

- ⑥ (h) ① Address 3 contains the MAC address of the router that attached to the AP.
- ② Address 4 is used for ad hoc networks only.

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